

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
3 November 2005 (03.11.2005)

PCT

(10) International Publication Number
WO 2005/101993 A2

(51) International Patent Classification: Not classified

(21) International Application Number:
PCT/US2004/043745

(22) International Filing Date:
23 December 2004 (23.12.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/532,322 23 December 2003 (23.12.2003) US

(71) Applicant (for all designated States except US):
TRUSTEES OF TUFTS COLLEGE [US/US]; 136
Harrison Avenue, Boston, MA 02111 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): VALLUZZI, Regina
[US/US]; 448 Broadway, #2, Somerville, MA 02145
(US). HAAS, Terry, E. [US/US]; 5 Clemmons Street,
Southborough, MA 01772 (US). GUERTIN, Robert, P.
[US/US]; 345 Commonweath Ave. #1, Boston, MA 02115
(US). HUANG, Jia [CN/US]; 63 Edward Street, Apt. 2,
Medford, MA 02155 (US). JIN, Hyoung-Joon [KR/KR];
Yoenheedong 84-21, Seodaimoongu, Seoul (KR).

(74) Agents: GORDON, Dana, M. et al.; Patent Group, Foley
Hoag LLP, 155 Seaport Boulevard, Boston, MA 02210-
2698 (US).

(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ,
TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA,
ZM, ZW.

(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,
FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO,
SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN,
GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— without international search report and to be republished
upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

(54) Title: METAL-CONTAINING NANOLAYERED COMPOSITES, AND APPLICATIONS THEREOF

(57) Abstract: Disclosed are peptide-metal composite materials that comprise small linear polypeptides at least some of which feature rare-earth metals coordinated to acids or bases in their side chains. The resulting composites crystallize in smectic-like arrays over length scales much longer than those of the molecular dimensions. The resulting crystals (1-2 mg) were insulating and transparent in the visible spectrum. The rare earths form quasi-two dimensional sheets with a separation distance determined by the linear dimension of the oligopeptide. The magnetization, M(B,T), was determined down to 2 K and in fields to 5.5 T using SQUID magnetometry. All samples were paramagnetic. Crystalline electric field modification of the magnetization was evident in isothermal M(B) for dysprosium (Dy)-based composites.



WO 2005/101993 A2